TWO NEW SPECIES OF *FLEXAMIA* FROM THE NEBRASKA SAND HILLS (HOMOPTERA: CICADELLIDAE: DELTOCEPHALINAE)¹

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Abstract.—Two new species of *Flexamia* from perennial chloridoid grasses in the Nebraska Sand Hills are described and illustrated. These are **F. celata** and **F. arenicola**. The previously unknown female of *F. dakota* is also described.

The genus *Flexamia* is one of the most important and conspicuous groups of grassland cicadellids. In addition to species recognized by Young and Beirne (1958) in their revision, Hamilton and Ross (1975) described *F. satilla*, and Ross and Cooley (1969) added *F. delongi*. Although the latter form may be a geographic variation of *sandersi*, its description raises to 36 the number of described species. In this report we described two new species and the female of *dakota*.

The new species, *F. arenicola* and *F. celata*, were discovered in sand blowouts in the Nebraska Sand Hills; they are closely related to *F. flexulosa* and *F. stylata* respectively, but differ in male genitalic structures. *F. dakota*, whose female had been previously unknown, was collected from Texas to North Dakota and on west-facing slopes in the Loess hills of western Iowa. All collections of *dakota* were from *Schizachyrium scoparium* (Michx.) Nash. The cicadellid species we describe are named from material collected by R. F. Whitcomb.

Type material is deposited in the U.S. National Museum of Natural History (USNM) and Kansas State University (KSU). Paratypes are deposited also in the Grassland Cicadellid Collection of the Insect Pathology Laboratory, ARS, USDA, Beltsville Agricultural Research Center-East (BARC-E), Beltsville, Maryland.

Flexamia celata Lowry and Blocker, New Species Fig. 1

Description. – Length of δ 4.4 mm, \circ 4.4– 4.7 mm; head width of δ 1.3 mm, \circ 1.4 mm; pronotal width of δ 1.2 mm, \circ 1.3 mm; interocular width of δ 0.6 mm, \circ 0.7 mm; vertex length of δ 0.7 mm, \circ 0.8 mm; pronotal length of δ 0.5 mm, \circ 0.6 mm. Vertex not produced; median length of vertex approximately $\frac{1}{2}$ head width and slightly longer than interocular width.

Color pale stramineous with irregular dark markings on dorsum and forewings; vertex with black interocular line; head and pronotum with faint tan markings as *stylata*; venter and legs with irregular fuscous markings; 9 sternum VII with pair of conspicuous fuscous stripes.

Male pygofer with central margin strongly

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Fig. 1. *Flexamia celata.* A, acdeagus and connective, lateral aspect. B, same, ventral aspect. C, right style, dorsal aspect. D, male plates. E, male pygofer, lateral aspect. F, female seventh sternum. G, bases of first valvulae of female.

produced to form spinelike process as stylata; plates extend to approximately ²/₃ length of pygofer, fused mesally for 1/2 length, narrowed apically to rounded lateral lobe, apices of the two plates meeting in v-shaped notch: connective in lateral view with dorsal keels broad, approximately 1/2 height of dorsal apodeme; apodemal processes straight, unmodified, in dorsal aspect parallel to aedeagal shaft; style digitate in apical 1/3, preapical lobe pronounced; aedeagus symmetrical, shaft slender, not conspicuously curved, not expanded apically, central and paired apical processes approximately equal in length and less than 1/4 length of shaft. gonopore apical on caudodorsal surface.

Female sternum VII with posterior margin produced medially, with slight medial notch; ovipositor with basal processes of first valvulae recurved and extending laterad beyond lateral margin.

Types.—Holotype 3: Garden Co., Nebraska, Crescent Lake National Wildlife Refuge, 27-VI-1984, R. F. Whitcomb. Deposited in USNM. Paratypes: 1 9, Sheridan Co., Nebraska, Lakeside, 28-VI-1984; 2 3, holotype locality, 28-VI-1984. Deposited at KSU and BARC-E.

Remarks.—*Flexamia celata* keys to couplet 9 in Young and Beirne's key to males and is apparently closely related to *stylata*. It can be distinguished by the shaft of the aedeagus which is slender, not conspicuously curved, not expanded apically, and which has shorter apical appendages. The processes at the base of the first valvulae of the ovipositor are diagnostic.

Additional records: Most specimens were

VOLUME 89, NUMBER 1



Fig. 2. *Flexamia arenicola*. A, aedeagus and connective, lateral aspect. B, same, ventral aspect. C, right style, dorsal aspect. D, male plates. E, male pygofer, lateral aspect. F, female seventh sternum. G, bases of first valvulae of female.

taken from *Redfieldia flexuosa* (Thurb.) Vasey. NEBRASKA: Box Butte, Cherry, and Hooker counties June–August.

The name *celata* is an adjective meaning "hidden."

Flexamia arenicola Lowry and Blocker, New Species Fig. 2

Description.—Length of δ 3.7–3.8 mm, φ 3.8–4.1 mm; head width of δ 1.1–1.2 mm, φ 1.2–1.3 mm; pronotal width of δ 1.0–1.1 mm, φ 1.1–1.2 mm; interocular width of δ 0.5–0.6 mm, φ 0.6–0.7 mm; vertex length of δ 0.6–0.7 mm, φ 0.7–0.8 mm; pronotal length of δ 0.4–0.5 mm, φ 0.5–0.6 mm. Median length of vertex approximately $\frac{1}{2}$ head width and 1¹/₄ times interocular width.

Color pale stramineous with irregular dark brown markings on forewings and apex of vertex; faint stripes on vertex and pronotum; basal interocular lines fuscous to black; venter and legs with irregular fuscous markings; 9 sternum VII with pair of fuscous spots on hind margin.

Male pygofer with posterior lobe produced anteroventrally, caudal margin fuscous, with or without a small acute projection apically; plates extending to approximately 3 length of pygofer, mesal margins touching for 1/2 length then forming conspicuous v-shaped notch apically; style digitate apically; connective in lateral aspect with dorsal keels 1/2 height of dorsal apodeme; aedeagus symmetrical, apodemal processes divergent apically, nearly attaining tip of shaft, gonopore apical on caudoventral surface, with pair of lateral apical processes approximately 1/3 length of shaft and curved laterodorsally, with unpaired ventral process of approximate same length directed anteriorly.



Fig. 3. *Flexamia dakota*, female. A, seventh sternum. B, bases of first valvulae.

Female sternum VII with posterior margin produced medially, with slight median notch; ovipositor with recurved processes at base of first valvula not exceeding lateral margin, processes extending caudad, sinuate and digitate apically.

Types.—Holotype 8: Garden Co., Nebraska, Crescent Lake National Wildlife Refuge, 27-VI-1984. Deposited at USNM. Paratypes: 40 8, 15 9, same data as holotype; 1 9, Sheridan Co., Nebraska, 28-VI-1984; 1 8, Cherry Co., Nebraska, Brownlee, 9-VIII-1977. Deposited at KSU, BARC-E.

Flexamia arenicola is apparently closely related to *flexulosa* but can be distinguished by the expanded dorsal keels of the connective, the more robust aedeagal shaft and the longer aedeagal processes that are present in *arenicola*. It keys to couplet 17 in Young and Beirne's key to males. It can be distinguished from *modica* and *texana* by its larger size, and its nearly symmetrical aedeagus with lateral apical processes that are dorsally curved. The processes at the base of the first valvulae of the ovipositor are diagnostic.

Additional records.—All specimens were taken from *Muhlenbergia pungens* Thurb. NEBRASKA: Lincoln, McPherson, and Box Butte counties; COLORADO: Morgan Co., June–August.

The name *arenicola* is a noun in apposition meaning "sand inhabitant."

Flexamia dakota Young and Beirne Fig. 3

Description of \mathfrak{Q} .—Length 3.1–3.2 mm; head width 0.9–1.0 mm; pronotal width 0.8– 0.9 mm; interocular width 0.4–0.5 mm; vertex length 0.6–0.7 mm; pronotal length 0.3– 0.4 mm. Median length of vertex approximately $\frac{2}{3}$ head width and $1\frac{1}{2}$ times interocular width. Sternum VII with posterior margin produced with slight medial concavity; ovipositor without basal processes.

Remarks.—Young and Beirne did not separate the female of *dakota* from that of *sandersi* (see also *delongi* of Ross and Cooley, 1969). The females described here were found in association with males of *dakota*.

Additional records.—All specimens taken from *Schizachyrium scoparius*. IOWA: Harrison, Monona, Pottawattomie, and Woodbury counties; NEBRASKA: Cherry, Lincoln and McPherson counties; WYO-MING: Campbell, Platte, and Weston counties; TEXAS: Roberts and Travis counties; OKLAHOMA: Alfalfa Co., June– August.

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60